

Integrated Mechanical & Electrical Design

PAIR Army RDECOM Laboratory

Dominique McClain¹, John Sparks¹, Ryan Muzii^{1,2}

¹Edgewood Chemical Biological Center, Aberdeen Proving Ground, MD, ²Teledyne Brown Engineering, Belcamp, MD

Conceptualization

A team consisting of Artists, Engineers, Manufacturing Specialists, Technicians and other Subject Matter Experts conduct brainstorming sessions with the customer and other stakeholders. Through these initial discussions, the requirements and system limitations are recorded and a path forward is determined for the project. Integrated project teams are established to ensure the project or system ultimately meets the needs of the end users.



Design

The Advanced Design and Manufacturing Product Realization and System Engineering & Acquisition (ADM-PR, ADM-SEA) Divisions are composed of a workforce with various engineering, scientific, design and manufacturing backgrounds. These individuals collaborate using state of the art technologies to produce solutions that meet each function and physical requirements specified for the project. Modeling and simulation is often relied upon during the design phase to identify physical constraints and evaluate unusual operational conditions prior to fabrication. Mechanical and Electrical components are designed and integrated for form fit and function checks using software the SolidWorks and Altium Designer software packages.



The SolidWorks and Altium Designer programs support conceptualization, design, analysis and fabrication efforts. Information can be shared between the separate tools to provide integrated modeling, simulation and design-formanufacturing analysis.

Manufacturing and Production

With our in-house manufacturing and production facilities we are able to provide start to end solutions for our customers. Rapid fabrication of functional 3D electro-mechanical concepts, prototypes, and products can take as little time as a few hours by employing custom printed circuit board design with additive manufacturing. Unique mechanical components are made using welding, pattern and plastics, sheet metal, injection molding, and precision machining capabilities. Electrical engineers and integrators design and assemble custom circuit boards, cables, wire harnesses and electrical enclosures utilizing soldering stations, reflow ovens, heat shrink tubing, wire processing machines, electrical testing equipment and inspection equipment.

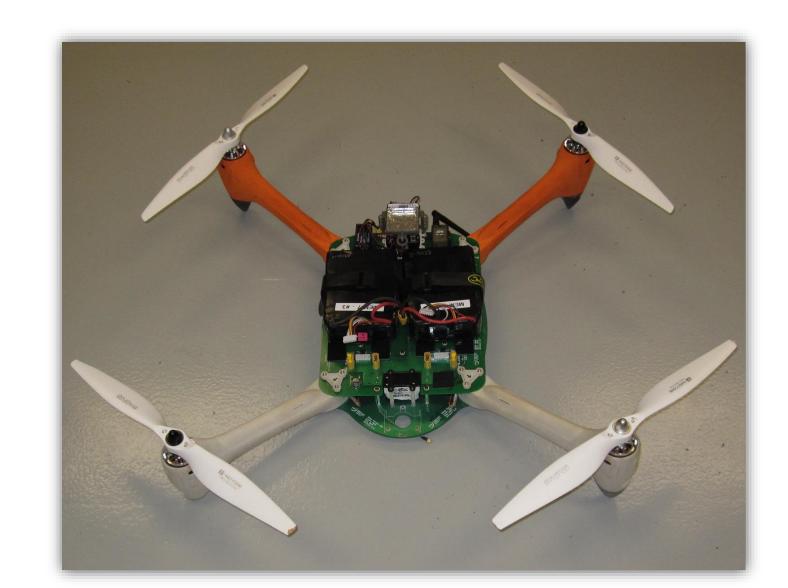


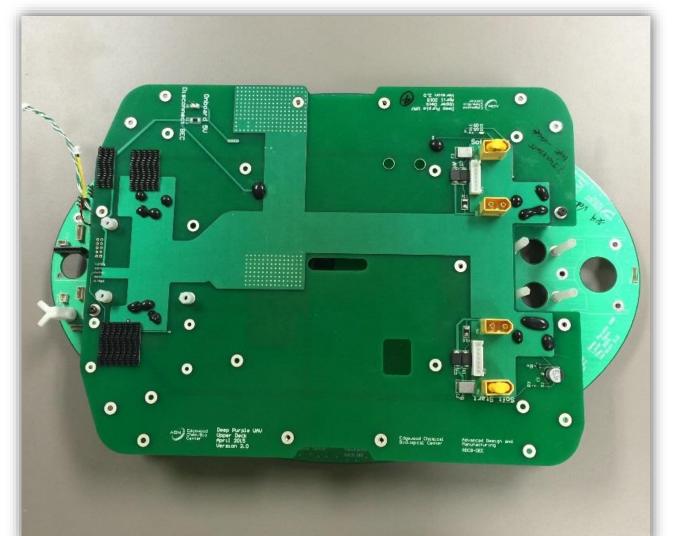
Example Projects

Husky Mounted Detection System – Trainer (HMDS-T) – developed as a trainer for the HMDS tactical system, this cost effective training system simulates detection of buried threats and provides critical information about the location and depth. The mechanical and electrical training components were designed, fabricated, and installed, and sustained by the ADM Divisions.



Deep Purple 2.0 (UAS) – an Unmanned Aircraft System (UAS) designed using integrated mechanical & electrical software tools, and assembled with additively manufactured components. The circuit board not only provides electrical distribution, but acts as the structural frame of the UAS.





TECHNOLOGY DRIVEN. WARFIGHTER FOCUSED.